

HELCOM Project: an Integrated eCommerce System for SMEs in Greece[✧]

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***Abstract.** This paper addresses the issues relating to the business-to-consumer (B2C) and business-to-business (B2B) scenarios that have been implemented within the framework of a research project entitled “HELCOM - Hellenic ELeCtronic COMmerce”. The project aimed at providing insight to businesses and especially to SMEs, which want to take advantage of electronic commerce opportunities, by helping them design and implement efficient web strategies. Our main goal is to develop methods for creating successful B2C and B2B electronic stores. One of the most important factors of the approach is the easy customization of the implemented modules to different kinds of companies (e.g. spinning mills, raisin house, etc.). Moreover, the effectiveness of the electronic stores (e.g. usable presentation and navigation) is also under consideration.*

***Keywords.** B2C, B2B, eCommerce, case study*

1. Introduction

Nowadays, the exponential growth of the Internet has led to a radical change in the way business is conducted. eCommerce has ballooned into a multi-billion dollar market, since the current trend is that more and more users access eStores for purchasing goods and services. Companies have now the opportunity to upgrade their competitiveness and extend their sales turnover and market share through new forms of promotion, advertisement, marketing, interaction with external parties (customers and suppliers), activities and processes within the company, etc. Business-to-consumer (often condensed to B2C eCommerce) and business-to-business eCommerce (often condensed to B2B eCommerce) can facilitate internal interactions, improve customer relations and eliminate the constraints of time and place (e.g. provide customer support 24 hours a day, 7 days a week, accept and fulfill orders on an anytime-anywhere basis). Regardless of the specific form, eCommerce can build on the advantages and structures of traditional commerce by adding flexibilities and functionalities offered by electronic networks.

B2C is the part of eCommerce where the consumer can visit web sites, select products by matching his needs with the data in the online catalogue and send the digital request to the system administrator for approval. The system automatically inserts the order into a database of pending orders, checks inventory at the warehouses, validates consumer credit status, creates the invoice and forwards the item. Comparing the traditional way of doing commerce to the electronic, one easily realizes that many of the steps are the same, but the way that information is obtained and transferred is different. The new form of making

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commercial transactions can simplify communication, change traditional relationships, and offer new opportunities to both consumers and businesses.

B2B is the part of eCommerce where there is one or more set of transactions where businesses -rather than a business and an individual- are placed at both ends of the line. The same category also includes those cases in which purchases for a company are made by the individuals who are part of it; this, for example, is what usually happens with stationery, which is requested by single employees but paid for and ordered on behalf of them by the company, and is generally referred to as corporate procurement. B2B eCommerce is becoming more and more important, because the Internet provides an easy and inexpensive way to connect different businesses in an efficient manner. Many financial analysts, in fact, expect B2B to become the largest sector of the overall eCommerce market, with some experts placing it to as much as 90% of all transactions in the near future [8].

In this context, it is easily conceivable that a new approach is required for the design of successful business scenarios in the new electronic age. Besides, for most companies the notion of eCommerce refers to the adaptation of new technologies and the organizational transformation and not to innovation from scratch. At the same time, the basic problem is that it has become very difficult to identify the best business practices [1]. As the competition in this market is extremely fierce, companies that offer the best user experience are the ones most likely to succeed on the web. The main issue here is to combine technical and business opportunities for helping companies succeed online by designing and developing usable and effective eStores with minimum time, cost and human resources [3], [4].

In this paper we describe our approach for the successful design and development of B2C and B2B online stores, which are in other words, supplier sites (a business that sells products and services to consumers as well as to other businesses). All customers via an Internet browser can access the B2C.store, navigate through the online catalogue, select products or services, request approvals and forward orders for purchasing. On the other hand, the B2B.store can only be accessed by authorized users, who do not directly pay for their purchases, and provides a set of rules for accomplishing various tasks, such as authorizing orders that go beyond the individual's purchase limit or delivering a purchase order directly to a supplier.

The proposed methodology engages in a range of issues concerning user needs, advanced designing and development modules, support and evaluation of the whole process, so that shoppers and stores can achieve the necessary insight and progress. The approach allows easy customization of the developed modules to different kind of B2C and B2B stores (e.g. spinning mills, raisin house, etc.). Moreover, special attention is given to issues of customer support, product navigation, product information, and purchase transaction. In each of these areas, our goal is to make buying goods and services comfortable, easy, and enjoyable [5], [7].

This work is organized as follows; the next section presents all the steps of the methodology followed throughout the implementation of the applications; special reference is given to usability aspects since the scenarios involved transactions between e.g. spinning mills, raisin house and their external partners with no previous background in eBusiness; section 3 describes in brief the main modules of the proposed system architecture, its functionally and the general platform developed to allow easy and straightforward implementation; section 4 presents the basic elements of B2C.store and B2B.store, prototype eStores developed for testing the proposed system, while the last section comprises conclusions and future plans.

2. Development approach

Our approach for designing usable eStores comprises several discrete phases that eCommerce engineers should take proper care of, in order to achieve usability and effectiveness [11], [12]. Lack of efficiency in any of these phases may well result in a general eStore marketing failure. The importance of the proposed approach can be certified in the sense that it adapts with minimum technical effort in different types of stores, easily expands to handle unexpected growth in merchandising, successfully enables consumers to browse products and then order them directly from the online store 24 hours a day, 7 days a week.

Building and maintaining a successful eStore is a continuous process, in which firstly we develop a vision of the site and then plan how to implement that vision. The next steps include the development of the plan, the deployment and the validation of the system. Analytically, the process begins with the identification of the content and the functional specifications, continues with the presentation design and the definition of navigation facilities and finally covers advanced user interface features and usability issues. Emphasis is placed on the essential characteristics and features that a usable eStore should provide. More specifically, there are five phases in the approach (figure 1):

- ✓ **Identification of content design:** The first phase is the identification of the information content, which should be clear and specific. By thoroughly examining and planning we can significantly increase the efficiency and availability of the provided services, and ensure that the planning will be accurately reflected in the future phases of the development approach. The store must determine and point out the proper information that the potential customers will find most interesting. The structuring and the correct organization of the provided information have also a significant influence on the web site success.
- ✓ **Functional design:** The next phase is to decide about the provided functionalities. Within the context of an eStore this means significant facilities that increase users' efficiency and satisfaction. Information and operations should be grouped and represented properly along successive web pages. Novice and expert user's support should also be taken under serious consideration. Generating appropriate diagrams that describe the event-sequence of the users and the flow of requests through the various modules of the system can highlight difficult-to-envision problems and potential bottlenecks.
- ✓ **Presentation design:** The presentation design phase should establish the eStore's identity and give a clear overview of its content. The designers should follow presentation standards and guidelines in order to take advantage of good practices and also increase the probability of user's satisfaction during the purchase process [9], [10]. The content should be presented in a natural way. The aim of a professional presence in the web is to guide and not to disorientate. The users must assimilate easily the store's behaviour. This means that some basic presentation rules should be adopted, such as: careful usage of colours, well-balanced employment of graphics and text, proper selection of buttons and menus, correct placement of titles, text and images, appropriate choice of fonts and styles, unified and consistent format.
- ✓ **Navigation layout strategy:** The navigation between pages is an important aspect for the success of an e-store. If a user has trouble navigating from one page to another or cannot reach fast the desired information, he/she will choose a different e-store to acquire the item of interest. Consumers need to find everything they look for quickly and easily. They should feel comfortable while navigating through pages or scrolling down a page.

- ✓ **Advance features design and functionality:** The last phase refers to the observation of customer behaviour. The eStore adapts its presentation and functionalities to the identified user's profile. The customer preferences can be partly derived from his/her behaviour throughout his/her interaction within the store (e.g. sequence of web pages accessed). Sometimes for this reason, a special purpose questionnaire or a test is used in order to get a better view of the customer's purchase preferences. Collecting data on user visits to the store, including the frequency and duration of visits and use of various operations and functionalities, is critical for developing a site that meets business needs. The achievement of usability is essential for any competitive eStore [5], [9], [10]. Usability focuses on the user interface of the store and refers to the elements that the user directly interacts with e.g. screens, menus, and navigation controls. Furthermore, usability is a measure of how the eStore has succeeded its goals. Fundamental user interface design principles can be applied to the degree though, at which the eStore lives up to its initial expectations. Such principles comprise learnability, memorability, simplicity, efficiency, consistency, user satisfaction and low error frequency [7].

3. Architecture

In this section we shortly present the architecture of our solution. More specifically, we define basic components and important concepts and describe the relationships among them. The key architectural ideas are to support a broad range of applications, to enable scaling of the system and to accommodate evolution in functionalities. Modular design plays an important role in the integration of the various internal and external system components with B2C.store and B2B.store (prototype eStores we have developed) [2], [6]. The system consists of the following main components:

- ✓ **B2C.store and B2B.store modules:** correspond to the web interface for communication between both the shopper (consumer or business correspondingly) and the store manager with the merchant web server. More specifically, it is concerned with marketing and selling goods and services. Also, the module manages the details of the transactions, from placing the order to payment and fulfilment. Proper handling of the transactions is important, such as ensuring that the relevant information is delivered to the right places and that the payment is collected correctly.
- ✓ **Electronic payment module:** supports the process of online electronic payment. In its simplest form the module takes over the order form from the merchant web server at the point when payment by credit card is appropriate. The payment gateway connects to a traditional financial network to authorize the transaction. Then the merchant computer stores the acknowledgment and sends a receipt to the shopper.
- ✓ **Database module:** information about shoppers, store and products being purchased are collected together in one place. Shopper information includes fields such as name, phone, shipping address, e-mail, way of payment, etc. Store information includes items such as payment methods accepted, means of fulfilment, etc. Product information includes items such as description, price, weight, taxability, etc. Also, this module allows the interconnection with the system servers.
- ✓ **Mediate module:** enables the interconnection with existing systems (e.g. ERPs, MIS, other enterprise financial and logistics systems).
- ✓ **Intranet module:** facilitates the internal communication of the business and offers functionalities like notices, shared files, forum, calendar, chat, online catalogue, help, etc. Only authenticated employees can access the intranet. Moreover, they have different privileges and access rights with respect to their position in the company. Responsible for assigning access rights is the site administrator.

Because of the general-purpose architecture we do not need to build the components again. We simply reuse and customize them in every specific case. The system architecture is schematically presented in figure 1.

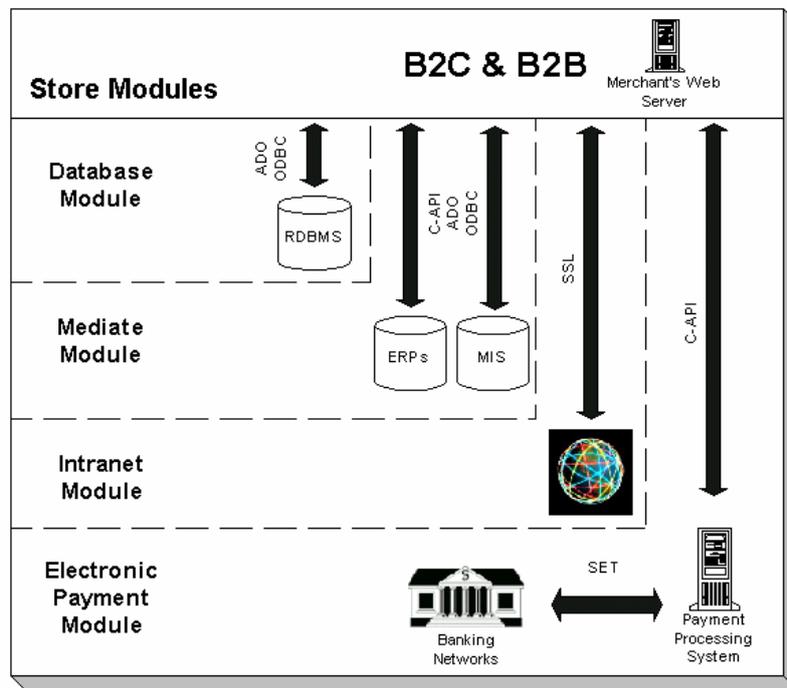


Figure 1. System architecture.

4. Prototype eStores

Both B2C.store and B2B.store are leading edge, graphically elegant sites and provide shoppers with a user-friendly shopping experience. As we have mentioned before authorized users can only access the B2B.store. The purchasing process is easy-to-use: the shopper simply chooses from an online catalogue, adds items to a basket and pays for the purchase total (which includes taxes and shipping costs) by credit card or by cash on delivery. eStores send a message (via e-mail) to the manager for fulfilment. In addition, online registration gathers shopper information for marketing purposes (a shopper must be a registered member to purchase the contents of his/her basket).

The implementation was conducted in two phases. Phase 1 implementation included login, membership, online catalogue, shopper personalization, product search, credit card processing, e-mail order verification, etc. Phase 2 implementation included tracking purchase history for shoppers, custom-entry pages for shoppers, daily and seasonal special highlighting, database-driven shopping cart, and administrative enhancements to allow viewing of recent financial transactions and product database updates.

The implemented eStores:

- ✓ Give customers the opportunity to access online catalogues, special offers and personal information at any given time.
- ✓ Examine the progress of the purchasing process through specific forms.
- ✓ Allow the users to select parameters such as: payment way, shipping way, etc.
- ✓ Use new technologies to provide advanced services and functionalities (personalized pages, shopping recommendation, secure electronic transactions, etc.).
- ✓ Offer a selection of components to support users (help, frequently asked questions, sitemap, index, chat room, newsletter, guest book, etc.).

- ✓ Provide facilities and usability features. The stores place a strong emphasis on understanding and fostering user needs.

Some additional, quite interesting features are also supported by the B2B.store:

- ✓ Customer (buyer)-specific pricing. For example, the store manager specifies that Customer A is to receive a discount of 20% on all purchases, and Customer B is to receive a discount of 5%. When Customer A logs in and views a product page, the price is displayed at 20% off list price. When Customer B logs in and views the same product page, the price is displayed at 5% off list price.
- ✓ Saved requisition lists. Each customer can save multiple “shopping lists” and use them to quickly fill in a requisition without having to relocate and add each product all over again.
- ✓ Shipping based on weight.
- ✓ Handling based on quantity.
- ✓ Free shipping and handling if the order is equal or over a specified amount.
- ✓ Credit limit and minimum purchase requirement per customer. The manager of B2B.store can specify a credit limit and a minimum purchase requirement (in drachmas) on a per-customer basis. If the customer’s order exceeds his credit limit, the order is marked as “pending approval” so the store manager can review it, and a message is generated informing the customer of that fact. If the customer’s order is below his minimum purchase requirement, a message informs the customer, asking him/her to add more items to his requisition.
- ✓ Tax adjustment for tax-exempt customers.

5. Conclusions

The presented eCommerce solution involves doing business online. However, designing and implementing an eStore is a complicated task. Businesses want to profit from the power of digital information, understand the needs and preferences of customers and trading partners, and then deliver the products, services, and information to them as quickly and with as little human interaction as possible. So, businesses that aim at having an effective web presence need guidance and information.

The suggested approach comes to meet these requirements and provide valuable knowledge on the best eCommerce practices. The key benefit of the approach is that it facilitates the development of different kinds of eStores. It also accommodates the needs of shoppers and stores so that everyone feels pleased and satisfied.

In this paper we have discussed the main issues of the proposed approach. The functionalities and the architecture of the B2C.store, as well as of the B2B.store were described and guidelines that will be extremely useful for building an eStore have been pointed out.

Finally, we can say that our main future direction is to introduce a more systematic methodology that will facilitate and guide the design and the development phases of usable B2C and B2B eStores. Obviously, there are many functional areas that need to be examined. As eStores continue to grow, internationalization of the sites for supporting local languages will be considered and new advanced features will be embedded in the architecture so as to enhance the value of the provided services .

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